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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHAN, CANDICE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,725	Applicant(s) MORITA ET AL.	
	Examiner Candice Y. Chan	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/26/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to the application filed 26 July 2006. Claims 1-8 are currently pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 5-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. “***Forming*** the oxygen implanted layer” by either polishing a portion of the active layer wafer or etching a portion of the active layer wafer is not disclosed in the instant specification (emphasis added). For the purpose of examination, the examiner assumes applicant intended to claim the step for ***exposing*** the oxygen ion implanted layer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Imai et al. (JP 02228061, note: all citations and page numbers are in reference to the English translation document attached herewith).

Regarding claim 1, Imai (Fig. 1) teaches a method for manufacturing SOI wafers in which a laminated wafer is formed by laminating an active layer wafer to a base wafer with an insulating film interposed therebetween, followed by reducing the thickness of the active layer wafer side to produce an SOI wafer, comprising the steps of:

implanting oxygen ions into the active layer wafer **11** to form an oxygen ion implanted layer **12** on the active layer wafer (Fig. 1a; p. 8, ¶3-4);

reducing the oxygen in the vicinity of the surface layer of the active layer wafer by out diffusion by heat treating the active layer wafer on which the oxygen ion implanted layer has been formed in a reducing atmosphere (p. 8, ¶4);

forming a laminated wafer by laminating the active layer wafer onto a base wafer **21** with an insulating film **16** interposed therebetween (Fig. 1c);

allowing a portion of the active layer wafer to remain on the surface side of the oxygen ion implanted layer by grinding the active layer wafer portion of the laminated wafer (Fig. 1d; p. 9, ¶2);

exposing the oxygen ion implanted layer by polishing or etching a portion of the remaining active layer wafer (Fig. 1e; p. 9, ¶3);

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forming an oxide film of a predetermined thickness on the exposed surface of the oxygen ion implanted layer by oxidation treatment of the laminated wafer (p. 9, ¶4); and, removing the oxide film (Fig. 1f; p. 9, ¶4).

Regarding claim 6, Imai teaches the method for manufacturing SOI wafers according to claim 1 or claim 3, Imai teaches further wherein the step for exposing the oxygen ion implanted layer is carried out by etching a portion of the active layer wafer using an alkaline etching solution (p. 9, ¶3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (JP 02228061, note: all citations and page numbers are in reference to the English translation document attached herewith).

Regarding claim 3, Imai discloses the method for manufacturing SOI wafers according to claim 1 however fail to expressly disclose wherein the oxygen dose in the step for forming the oxygen ion implanted layer is $5.0E16$ to $5.0E17$ atoms/cm².

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Imai and Sakaguchi to include the oxygen dose of 5.0×10^{16} to 5.0×10^{17} atoms/cm² since it has been held that claimed ranges of a result effective variable are unpatentable unless they produce a new and unexpected result. In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996).

This claim is prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a

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temperature of 100°C and an acid concentration of 10%.); see also Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382 (“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages.”); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).

Regarding claim 5, Imai teaches the method for manufacturing SOI wafers according to claim 1 or claim 3, Imai teaches further wherein the step for exposing the oxygen ion implanted layer is carried out by polishing a portion of the active layer wafer while supplying an abrasive (p. 9, ¶2), however fails to expressly disclose having an abrasive particle concentration of 1% by weight or less.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the abrasive particle concentration of 1% by weight or less, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 2, 4 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (JP 02228061, note: all citations and page numbers are in reference to the English translation document attached herewith) in view of Yokokawa et al. (US 6,312,797).

Regarding claim 2, Imai (Fig. 1) teaches a method for manufacturing SOI wafers comprising injecting oxygen ions from the surface of the SOI wafer to form an oxygen ion implanted layer **12** (Fig. 1a; p. 8, ¶3-4); exposing the oxygen ion implanted layer by polishing or etching a portion of the active layer wafer from the separated surface to the oxygen ion implanted layer (Fig. 1e; p. 9, ¶3); forming an oxide film of a predetermined thickness on the exposed surface of the oxygen ion implanted layer by subjecting the SOI wafer to oxidation treatment (p. 9, ¶4); and, removing this oxide film (Fig. 1f; p. 9, ¶4). However, Imai fails to expressly disclose wherein ions of hydrogen or a noble gas element are implanted in an active layer wafer through an insulating film to form an ion implanted layer on the active layer wafer, the active layer wafer is laminated to a base wafer with an insulating film interposed therebetween to form a laminated wafer, the laminated wafer is subjected to heat treatment, and a portion of the laminated wafer is separated at the boundary with the ion implanted layer to produce an SOI wafer.

Yokokawa discloses a method of making SOI wafers wherein ions of hydrogen or a noble gas element are implanted in an active layer wafer **2** through an insulating film **3** to form an ion implanted layer **4** on the active layer wafer (see Figure, a-c), the active layer wafer is laminated

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to a base wafer **1** with an insulating film **3** interposed therebetween to form a laminated wafer (Figure, e), the laminated wafer is subjected to heat treatment, and a portion of the laminated wafer is separated at the boundary with the ion implanted layer to produce an SOI wafer (Figure, f; Col. 5, lines 27-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Imai to include the steps of Yokokawa to utilize a well-known wafer bonding technique known as the “smart cut” method (Col. 1, lines 5-13).

Regarding claim 4, Imai and Yokokawa disclose the method for manufacturing SOI wafers according to claim 2 however fail to expressly disclose wherein, the oxygen dose in the step for forming the oxygen ion implanted layer is 5.0×10^6 to 5.0×10^7 atoms/cm².

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Imai and Yokokawa to include the oxygen dose of 5.0×10^6 to 5.0×10^7 atoms/cm² since it has been held that claimed ranges of a result effective variable are unpatentable unless they produce a new and unexpected result. In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996).

Regarding claim 7, Imai and Yokokawa teach the method for manufacturing SOI wafers according to claim 2 or claim 4, Imai teaches further wherein the step for exposing the oxygen ion implanted layer is carried out by polishing a portion of the active layer wafer while supplying an abrasive (p. 9, ¶2), however fails to expressly disclose having an abrasive particle concentration of 1% by weight or less.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the abrasive particle concentration of 1% by weight or less, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 8, Imai and Yokokama teach the method for manufacturing SOI wafers according to claim 2 or claim 4, Imai teaches further wherein the step for exposing the oxygen ion implanted layer is carried out by etching a portion of the active layer wafer using an alkaline etching solution (p. 9, ¶3).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Candice Y. Chan whose telephone number is (571)272-9013. The examiner can normally be reached on M-F, 8-4:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571) 272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew C. Landau/
Supervisory Patent Examiner, Art Unit
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